

1. A method of polishing, comprising:

holding a substrate on a substrate mounting surface that is vertically movable relative to a base rigid base of a carrier head in a chemical mechanical polishing apparatus;

5 bringing the substrate into contact with a polishing surface;

creating relative motion between the polishing surface and the substrate; and

maintaining the substrate beneath the substrate mounting surface with a retaining ring that includes a generally annular lower portion having a bottom surface for contacting the polishing surface during polishing, and a generally annular upper portion having a bottom surface joined to the lower portion and a top surface fixed to and abutting the base, and wherein the lower portion is made of a plastic and the upper lower portion is made of a metal which is more rigid than the plastic.

15 2. The method of claim 1, further comprising dispensing a slurry onto the polishing surface.

3. The method of claim 1, further comprising applying a load from the mounting surface to press the substrate against the polishing surface.

20 4. The method of claim 3, wherein applying a load includes pressurizing a chamber in the carrier between the substrate mounting surface and the base.

25 5. The method of claim 1, wherein creating relative motion includes rotating the polishing surface.

6. The method of claim 1, wherein creating relative motion includes rotating the carrier head.

30 7. The method of claim 1, wherein the plastic is substantially inert to a chemical mechanical polishing process.

8. The method of claim 1, wherein the lower portion is thicker than the substrate.

9. The method of claim 8, wherein the lower portion is between about 100 and 400 mils thick.

10. The method of claim 1, wherein the plastic is selected from the group consisting of polyphenylene sulfide, polyethylene terephthalate, polyetheretherketone, and polybutylene terephthalate.

11. The method of claim 10, wherein the plastic is polyphenylene sulfide.

12. The method of claim 1, wherein the metal is selected from the group consisting of steel, aluminum, and molybdenum.

13. The method of claim 1, wherein the plastic has an elastic modulus about ten to one-hundred times the elastic modulus of the metal.

14. The method of claim 1, wherein the lower portion is adhesively attached to the upper portion.

15. The method of claim 1, wherein the lower portion is attached to the upper portion with screws.

16. The method of claim 1, wherein the lower portion is press fit to the upper portion.

17. A method of assembling a retaining ring, comprising:  
securing a generally annular lower portion made of a plastic and having a bottom surface for contacting a polishing pad during polishing to a bottom surface of a generally annular upper portion made of a metal which is more rigid than the plastic and having a

top surface configured to be mechanically affixed to and abut a rigid base of a carrier head.

18. The method of claim 1, wherein securing the lower portion to the upper  
5 portion includes adhesively attaching the lower portion to the upper portion.

19. The method of claim 18, wherein adhesively attaching the lower portion to the upper portion includes adhesively attaching with a slow-curing epoxy.

10 20. The method of claim 17, wherein securing the lower portion to the upper portion screwing the lower portion to the upper portion.

21. The method of claim 17, wherein securing the lower portion to the upper portion includes press fitting the lower portion to the upper portion.

15 22. The method of claim 17, wherein the plastic is substantially inert to a chemical mechanical polishing process.

20 23. The method of claim 17, wherein the lower portion is thicker than a substrate to be polished.

24. The method of claim 23, wherein the lower portion is between about 100 and 400 mils thick.

25 25. The method of claim 17, wherein the plastic is selected from the group consisting of polyphenylene sulfide, polyethylene terephthalate, polyetheretherketone, and polybutylene terephthalate.

26. The method of claim 25, wherein the plastic is polyphenylene sulfide.

27. The method of claim 17, wherein the metal is selected from the group consisting of steel, aluminum, and molybdenum.

28. The method of claim 17, wherein the plastic has an elastic modulus about  
5 ten to one-hundred times the elastic modulus of the metal.

29. A method of assembling a carrier head, comprising:  
securing a top surface of an upper portion of a retaining ring to be affixed to and  
abut a rigid base of the carrier head, wherein the retaining ring includes a generally  
10 annular lower portion made of a plastic and having a bottom surface for contacting a  
polishing pad during polishing, and wherein the upper portion is made of a metal which is  
more rigid than the plastic and includes a bottom surface joined to the lower portion.

30. The method of claim 29, further comprising securing a substrate backing  
15 assembly to the rigid base so that a substrate receiving surface of the substrate backing  
assembly is vertically movable relative to the rigid base.

31. The method of claim 29, wherein securing the substrate backing assembly  
to the rigid base includes clamping a flexure in the substrate backing assembly between  
20 the rigid base and the retaining ring.